

CLAIMS

## WHAT IS CLAIMED IS:

- SAC 927*
1. A needle-less injector suitable for injecting a fluid through a surface, said needle-less injector comprising:
    - a housing containing the fluid, said housing further containing at least one orifice;
    - an engine fitted within said housing, said engine containing a gas;
    - a diffuser affixed to said housing, said diffuser having an unobstructed air passage about its circumference;
    - a driver that forces said fluid out of said housing, said driver being slidably disposed within said housing; and
    - a trigger coupled to said housing.
  2. The needle-less injector in accordance with claim 1, said diffuser includes aerodynamic fins disposed in such a manner so as to aid in air flow through said unobstructed air passage.
  3. The needle-less injector in accordance with claim 2, said diffuser includes three aerodynamic fins configured equidistant from one another about the circumference of said diffuser.
  4. The needle-less injector in accordance with claim 1, further comprising a valve, said valve comprising:
    - a valve stem having a circular ridge;
    - a valve head affixed to said valve stem and said circular ridge;
    - a valve stem guide affixed to said engine; and
    - a spring having a first end resting against said circular ridge and a second end resting against said valve stem guide;

wherein depression of said trigger causes said valve to open.

5. The needle-less injector in accordance with claim 4, said valve including an airtight ring forming an airtight seal with said valve head upon closure of said valve.

6. The needle-less injector in accordance with claim 4, said diffuser including an O-ring to prevent leakage of said gas between said diffuser and said valve to a local atmosphere.

7. The needle-less injector in accordance with claim 1, said driver including:  
a piston; and  
a plunger.

8. The needle-less injector in accordance with claim 7, wherein  
said plunger is symmetrical; and  
said plunger forms a substantially airtight seal with said housing.

9. The needle-less injector in accordance with claim 7, said plunger including:  
a conical front end;  
a conical back end; and  
a cylindrical body.

10. The needle-less injector in accordance with claim 9, said plunger further comprising at least one ridge surrounding said cylindrical body.

11. The needle-less injector in accordance with claim 7, said piston including an expansion cup.

12. The needle-less injector in accordance with claim 1, further comprising an ampoule cap removably attached to said housing, wherein said ampoule cap forms an airtight seal over said orifice of said housing.

13. The needle-less injector in accordance with claim 1, said trigger including an end with a non-slip surface.

14. The needle-less injector in accordance with claim 1, said trigger further including at least one retainer hook mechanism and said housing further including at least one latch retainer mechanism.

15. The needle-less injector in accordance with claim 1, said diffuser further including a locking ring and said engine further comprising at least one grip.

16. The needle-less injector in accordance with claim 15, wherein said at least one grip locks over said locking ring prior to use of said needle-less injector.

17. The needle-less injector in accordance with claim 1, said diffuser further comprising a knife-edge of material about its circumference prior to said diffuser being affixed to said housing, said knife-edge of material being deformed when used as material to affix said diffuser to said housing.

18. The needle-less injector in accordance with claim 1, further including a safety clamp removably attached to said housing, wherein said safety clamp prevents said trigger from moving relative to said housing in the axial direction of said at least one orifice.

19. The needle-less injector in accordance with claim 1, said housing further comprising at least one finger rest.

20. The needle-less injector in accordance with claim 1, said housing further including two finger rests disposed opposite one another, said finger rests having a non-slip surface.

21. The needle-less injector in accordance with claim 1, said needle-less injector remaining substantially silent upon administration of a needle-less injection.

22. A diffuser through which gas flows, said diffuser comprising:  
an unobstructed air passage about its circumference; and  
at least one aerodynamic fin affixed to said diffuser, said at least one aerodynamic fin being disposed in such a manner so as to aid in gas flow through said unobstructed air passage.

23. The diffuser in accordance with claim 22, said diffuser including three aerodynamic fins configured equidistant from one another about the circumference of said diffuser.

24. The diffuser in accordance with claim 22, wherein said at least one aerodynamic fin includes:  
a first end with a sharp edge;  
a second end with a rounded edge; and  
a substantially flat body portion therebetween,  
wherein said at least one aerodynamic fin is oriented such that gas first flows past said first end.

25. The diffuser in accordance with claim 22, wherein said at least one aerodynamic fin is oriented such that said fin is substantially parallel to the direction of gas flow.

26. The diffuser in accordance with claim 22, said diffuser further including an O-ring, said O-ring being circumferentially disposed about the exterior surface of said diffuser.

27. The diffuser in accordance with claim 22, said diffuser further including a central axis member, said central axis member being affixed to said at least one aerodynamic fin.

28. The diffuser in accordance with claim 27, said central axis member being bullet-shaped.

29. The diffuser in accordance with claim 22, said diffuser further including a knife-edge of material about its circumference, said knife-edge of material being deformed when used as material to affix said diffuser to the housing of a needle-less injector.

30. A method of assembling a needle-less injector suitable for injecting fluid through a surface comprising:

providing a housing, said housing further containing at least one orifice;  
slidably disposing a driver within said housing; and  
affixing a diffuser to said housing, said diffuser having an unobstructed air passage about its circumference

31. The method in accordance with claim 30, further including fitting an engine within said housing, said engine containing a gas.

32. The method in accordance with claim 30, further including coupling a trigger to said housing.

33. The method in accordance with claim 30, wherein said diffuser includes aerodynamic fins disposed in such a manner so as to aid in air flow through said unobstructed air passage.

34. The method in accordance with claim 30, wherein affixing said diffuser to said housing further includes deforming a knife-edge of material provided about an outer circumference of said diffuser.

35. The method in accordance with claim 34, wherein deforming said knife-edge of material is performed by ultrasonic welding.